

17. Fly Investigations Reports.—I. Some Observations on the Life-History of the Blow-Fly and of the House-Fly, made from August to September, 1915, for the Zoological Society of London. By WINIFRED H. SAUNDERS\*.

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#### THE BLOW-FLY.

The breeding-material used was raw meat—a mixture of beef and mutton scraps. The meat was placed in pickle-jars, into which the flies were introduced; the tops were covered with muslin, and eggs were laid on the meat contained in these traps. The temperature of the room in which they were kept varied from 40–60° F.

Batches of Bluebottles (*Calliphora erythrocephala*) and Greenbottles (*Lucilia caesar*) were watched and compared, and the table given below shows very slight differences in the period of metamorphosis.

| <i>Bluebottle.</i> |                | <i>Greenbottle.</i> |                |
|--------------------|----------------|---------------------|----------------|
| Ova laid,          | Sept. 1st–2nd. | Ova laid,           | Aug. 24th.     |
| „ hatched,         | „ 2nd–3rd.     | „ hatched,          | „ 25th.        |
| Larvæ pupated,     | „ 14th–19th.   | Larvæ pupated,      | Sept. 4th–5th. |
| Flies emerged,     | „ 27th.        | Flies emerged,      | „ 15th–29th.   |

As batches of eggs were laid they were isolated, and, so far as possible, the development was watched. The eggs were, as a rule, deposited in little crevices in the meat. The flies are attracted to moist meat whether fresh, foul, raw, or cooked, but they avoid dried meat.

*Egg-laying.*—This was observed through a binocular dissecting microscope. A fly which had been isolated in a test-tube with a piece of meat deposited eggs within an hour after being captured. The long ovipositor (about half the length of the body and a very sensitive structure) felt the surface before the passage of each egg.

The eggs which I saw laid were placed parallel with one another, and arranged in the typical compact little group.

In *hatching*, the egg splits longitudinally along a suture marked by a white line. It splits first at the broader end, on the convex side, which is in contact with the dorsal surface of the larva. The rupture is brought about by the pressure of movement within, and begins with a narrow slit, which lengthens as the maggot escapes. The empty shell very quickly shrivels.

\* Communicated by Prof. H. MAXWELL LEFROY, M.A., F.Z.S.

*Maggot*.—The larval stage lasted from 10 to 16 days in most cases, but no moults were discovered.

*Puparium*.—The resting-stage covered from 8 to 13 days in the Bluebottle, but the Greenbottle spent up to 24 days in that condition.

Some eggs and maggots perished in a temperature of 38° C. The last batches remained in the maggot stage for many weeks, and they all succumbed at the beginning of November.

#### THE HOUSE-FLY (*Musca domestica*).

Eggs were laid on banana, either in cracks or crevices of the pulp or under the loose skin.

As batches of eggs were found they were isolated in small dishes. They were laid in material kept in a room where flies were bred. The maggots fed on banana and a mixture of bread, casein, and sugar moistened with water. Changes in growth were observed, but, as in the Blow-fly, no larval moults could be seen. The method of egg-laying and of hatching is similar to that of the Blow-fly.

Some batches of eggs were divided, one half being kept at the normal temperature of the room (40–60° F.) and the other at 38° C. (100°·4 F.). The results were as follows:—

*Temperature 100°·4 F.*

*Temperature 40–60° F.*

*Batch 1.* Eggs laid September 1st–2nd.

Hatched Sept. 2nd–3rd.

Hatched Sept. 2nd–3rd.

Pupated „ 7th–10th.

Pupated „ 15th.

Emerged „ 12th–16th.

Emerged „ 26th–27th.

Total 14 days.

Total 25 days.

*Batch 2.* Eggs laid September 3rd–4th.

Hatched Sept. 5th.

Hatched Sept. 5th.

Pupated „ 12th.

Pupated „ 16th.

Emerged „ 15th–16th.

Emerged „ 28th.

Total 11 days.

Total 23 days.

*Batch 3.* Eggs laid September 5th.

Hatched Sept. 6th.

Hatched Sept. 6th.

Pupated „ 13th.

Pupated „ 22nd.

Emerged „ 15th–16th.

Emerged „ 28th–29th.

Total 10 days.

Total 23 days.

*Batch 4.* Eggs laid September 6th–7th.

Hatched Sept. 7th.

Hatched Sept. 7th.

Pupated „ 14th–15th.

Pupated „ 23rd.

Emerged „ 16th.

Emerged „ 30th.

Total 9 days.

Total 23 days.

*Conclusions.*

The four batches of the House-fly show that the higher temperature hastens development—38° C. appears to be the maximum, the maggots cannot endure 40° C., and Blow-fly maggots perish at 38° C.

The experiments serve only to confirm records previously published.

The enquiry closed at the end of September, so that within a month there was no opportunity of repeating and checking the Blow-fly results, nor of observing hibernating habits with the approach of winter.

It is interesting to note that the Blow-fly will breed together with the House-fly in the mixture of bread, casein, sugar, and banana, and it would be worth while following the investigations through the winter with a view to clearing up points connected with hibernation, etc.